Summary and Conclusions

The connection between emotions and health though has been well documented (e.g., see Pandey & Choubey, 2010), recent literature suggests that most of the attempts to explain the said connection has been limited to the stress-coping framework of the Lazarus (1966) and there is a paucity of models to explain the emotion and health connection beyond this framework (Sundararajan, 2012). The present research makes an attempt to understand the connection between emotion and health (particularly between emotional processing deficit and mental health) in terms of emotion related beliefs (or more generally emotional beliefs) and thus in a sense it goes beyond the stress-coping framework of Lazarus (1966) in explaining the link between emotion and health.

The major focus of the present research is to understand how and to what extent the deficient ways of emotional processing or various manifestations of emotional processing difficulties (emotional processing deficit) relate with symptomatic complaints of mental health problems. The current investigation also attempts to examine the role of negative affect in relation to emotion related beliefs and emotional processing deficit in understanding mental health status of an individual.

Review of literature revealed that though some preliminary empirical evidences provide support to the speculation that emotional processing deficit correlates with mental health (Baker et al., 2007), there is a scarcity of direct empirical studies examining the relationship of various components of emotional processing with mental health. However, a bulk of studies provides indirect support to this speculation by examining the relationship of the constructs closely linked or analogous to some components of emotional processing system (such as alexithymia, emotional suppression, emotional disclosure, emotion regulation/dysregulation, avoidance etc.,) with mental health (Honkalampi, Hintikka, Tanskanen, Lehtonen, & Viinamäki, 2000; Flett et al., 1996; Jansen & Muenz, 1984, Garnefski, et al., 2004).

Further, the review also revealed that most of the studies have either compared the patient groups with control on either some componential measure of emotional processing deficit or on the overall score of some comprehensive measure of emotional processing (Jänsch, Harmer, & Cooper, 2009). Such clinical approach of examining the differences in emotional processing deficit between clinical groups and normal control suffers from certain inherent methodological issues such as confounding of comorbid conditions, clinical heterogeneity in symptomatic manifestations etc. Thus, taking this methodological
issue into account the present study made an attempt to explore the relationship of emotional processing deficit (and its various domains) with psychometrically assessed mental health problems on a non-clinical sample. Moreover, the review of literature also revealed that little has been done to explore the relative significance of various components of emotional processing deficit in predicting various types of mental health problems. Thus, attempt has also been made to explore the relative significance of various domains of emotional processing deficit in predicting mental health (and its various domains).

Though, the initial model of emotional processing as proposed by Rachman (1980) itself defines that processing of emotions refers to the ability to absorb negative emotions and a failure in it will result in accumulation of negative emotions. Despite this, little has been done to directly test this proposition of Rachman (1980). However, there are some indirect empirical evidences that support the proposition that deficit in emotional processing would be associated with negative affect (Dubey & Pandey, 2013; Gross, & John, 2003). Most of the studies have examined negative affect in relation to such constructs that indirectly reflect emotional processing or a deficit in it (e.g., emotion regulation, suppression, alexithymia etc.). These indirect empirical evidences do provide support to the possibility that emotional processing deficit will be associated with greater negative affect. The present study aims to empirically test this speculation and the findings would provide some preliminary data to support this relationship.

Though emotion theory has changed quite dramatically during the last three decades, to a large extent this change has been due to a keen interest in the role of cognition in emotion. The emergence of “cognitive emotion theory” (e.g., Lazarus, 1991), has stimulated a considerable body of research where beliefs are viewed as major antecedents of emotions. In the light of this theorization, the present research makes an attempt to understand the connection between emotion and health (particularly between emotional processing deficit and mental health) in terms of emotion related beliefs (or more generally emotional beliefs) and thus in a sense it goes beyond the stress-coping framework of Lazarus (1966) in explaining the link between emotion and health.

The review of empirical evidences clearly demonstrates that the emotion related beliefs (belief about emotion expression and negative mood regulation expectancies) have the potential to influence the mental health status of an individual (Catanzaro, 1993; Catanzaro, Wasch, Kirsch, & Mearns, 2000; Kassel, Jackson, & Unrod, 2000a; Kirsch, Mearns, & Catanzaro, 1990a; Mearns, 1991; Cramer, Gallant, & Langlois, 2005; Jack, 1991) and the emotion related beliefs have also been found to be associated with negative
emotional experiences (Kassel, Bornovalova, & Mehta, 2007). However, the review brings to fore the fact that there is scarcity of studies demonstrating the link of emotions related beliefs with emotional processing deficits and mental health problems.

**Objectives and hypotheses**

In the light of the aforesaid gaps in the existing literature, the present study makes an attempt to examine the relationship of emotional processing deficit with mental health and to explore how and to what extent certain emotion related beliefs (especially NMR expectancies and belief about emotional expression) and negative affect play role in this relationship. However, the present study is largely exploratory in nature thus an attempt was made to explore the relationship of various emotion related constructs with mental health as well as with each other before examining the interplay of these variables in determining mental health. More specifically, the objectives of the present study are:

More specifically, the objectives of the present study are,

1. To examine how and to what extent emotional processing deficit and its various domains are related with mental health problems.
2. To examine the relationship of emotional processing deficit (and its domains) with negative affect.
3. To examine the relationship of emotion related beliefs with emotional processing deficit (and its domains) and negative affect.
4. To examine the relationship of emotion related beliefs with mental health problems.
5. To examine the interplay of emotional processing deficit, negative affect, and emotion related beliefs and expectancies in predicting mental health.

**Hypotheses:**

On the basis of the available empirical evidences it is hypothesized that:

1. The emotional processing deficit and its various components would be associated with greater symptoms of mental health problems.
2. The emotional processing deficit and its various components would be associated with higher level of negative affect.
3. The acceptability belief about emotion and negative mood regulation expectancies would be associated with lower level of emotional processing deficit and negative
affect, whereas the non-acceptability belief would be associated with greater level of the same.

4. The acceptability belief about emotion and negative mood regulation expectancies would be associated with symptoms of mental health problems whereas the non-acceptability belief would be associated with greater symptoms of the same.

As far as the nature of interplay of various emotion related constructs in relation to mental health is concerned a very specific hypothesis is difficult to formulate in absence of direct empirical evidences. However, based on the available indirect and preliminary empirical evidences it is hypothesized that emotion related beliefs would work like an antecedent factor for both emotional processing deficit and negative affect and may have direct as well as indirect effect on it. Further, negative affect would be a mediational kink between emotional processing deficit and mental health as well as between emotion related beliefs and mental health. Thus, negative affect is hypothesized to be an outcome of both emotion related beliefs as well as emotional processing deficit. The following path model presents a summary of the hypothesized interplay of various emotion related variables in relation to mental health.

**Method**

To address the said objectives, a group of relatively heterogeneous sample of male and female adults of Varanasi who varied in terms of education level and occupation (N = 354) in the age range of 20-40 years were sampled (194 were males and 160 were females). Those participants who reported any history of medical or psychiatric illness or a neurological damage or disease were excluded from the present study. Emotional processing deficits were assessed using the emotional processing scale (Baker et al., 2010) whereas emotion related beliefs were. To operationalize and measure the construct of emotion related beliefs two measures were used- The Beliefs about Emotions Scale (Rimes & Chalder, 2010) and Negative Mood Regulation Scale (Catanzaro & Mearns, 1990). The Positive and negative affect schedule was used to assess the level of negative affectivity (Pandey & Srivastava, 2008). Mental health of the participants was assessed using 90 item Symptom Checklist-Revised. The data were analyzed using suitable correlation statistics, stepwise multiple regression analysis and structure equation modelling were performed to test the proposed hypotheses in the present study. The obtained findings have been summarized below.
Major findings (summary of results)

The correlation analysis revealed that emotional processing deficit and its various domains correlated significantly and positively with various dimensions of mental health as well as the global indices of mental health. The observed positive correlation indicates that individuals having difficulties or deficits in processing of emotions are likely to have more symptoms of mental health problems such as anxiety, depression, somatization, phobic anxiety, paranoid ideation etc.

The relative significance of various types of emotional processing deficits (domains of EPS) in predicting different types of mental health problems as well as the overall mental health was also examined by conducting a set of stepwise multiple regression analyses. The findings revealed that the three domains of emotional processing deficits viz., impoverished emotional experiences, signs of unprocessed emotions and unregulated emotions were found to be important in predicting most domains of mental health problems and the overall mental health to varied degree.

However, for predicting the level of hostility the ‘avoidance’ emerged as the second best predictor and contrary to the findings of correlation analysis it was found to reduce the level of hostility (as indicated by negative beta) rather than increasing it (as indicated by its positive correlation with hostility). This finding is an indicative of ‘suppression effect’. The observed suppression effect suggests that the ‘purified’ form of the avoidance (i.e., that component of avoidance which is free or independent of other domains of emotional processing deficit) is associated with lower level of hostility (as indicated by fewer symptoms of hostility) whereas the non-purified (i.e., without controlling the effect of other domains of EPD) form of it correlated greater hostility.

Another objective of the present study was to explore the relationship of emotional processing deficits with negative affect. The findings revealed that all the five domains of emotional processing deficit as well as the overall emotion processing deficit (the total score of all the five domains of EPD) correlated significantly and positively with negative affect. The relative significance of various domains of emotional processing deficits in predicting negative affectivity was also examined using stepwise multiple regression analysis. The findings revealed that the impoverished emotional experience emerged as the best predictor of negative affect followed by signs of unprocessed emotions, unregulated emotions, avoidance and suppression. The relative significance of various types of emotional processing deficits in explaining negative affect though differed; all the five domains were found to be significant contributor to the negative emotional experiences.
The present study also examined the relationship of emotion related beliefs (viz., beliefs about emotion expression and negative mood regulation expectancies) with emotional processing deficits and negative affect. The findings revealed that the NMR expectancies correlated significantly and negatively with negative affect, emotional processing deficit and its various domains (except avoidance). Similarly, the acceptability beliefs correlated significantly and negatively with negative affect, emotional processing deficit and its various domains. However, the non-acceptability beliefs correlated positively and significantly with only three domains of emotional processing deficit (viz., unprocessed emotions, unregulated emotions, and impoverished emotional experience), total score on the emotional processing deficit scale, and negative affect.

To examine the relative significance of various emotion related beliefs in predicting emotional processing deficit and negative affect a series of stepwise multiple regression analyses (MRA) were conducted using the said emotion related beliefs and expectancies as predictors and domains of emotional processing deficit and negative affect as criterion. The findings indicated that the NMR expectancy emerged as the best predictor of emotional processing deficit and it’s all domains (except avoidance) as well as of negative affect. The acceptability beliefs about emotions emerged as the best predictor of avoidance and the second best predictor of other domains of emotional processing deficits viz., signs of unprocessed emotions, unregulated emotions, impoverished emotional experiences and the overall emotional processing deficit. However, this belief emerged as the third best predictor of negative affect Non-acceptability beliefs emerged as the third best predictor of various emotional processing deficits except avoidance and negative affect.

Further, the relationship of emotion related beliefs and negative affect with various aspects of mental health was also examined. The findings revealed that the acceptability beliefs about emotion expression correlated negatively with each and every dimension of mental health, the relationship of this domain of emotion related belief was found statistically reliable only with obsession-compulsion, interpersonal sensitivity, depression, phobic anxiety, paranoid ideation and two of the global indices of mental health derived from the SCL-90-r, i.e. global severity index and positive symptom total. On the other hand, negative mood regulation expectancies correlated negatively and significantly with all the dimensions of mental health problems as well as the global indices of mental health. Contrary to it, the non-acceptability beliefs about emotion expression were found to be correlated significantly and positively with mental health and its various domains except symptoms of obsession-compulsion and hostility. As far as the relative contribution of the
aforesaid emotion related beliefs and expectancies in predicting various types of mental health problems is concerned, the findings of stepwise multiple regression analysis revealed that the NMR expectancies emerged as the best predictor of all the domains of mental health.

To sum up, the above mentioned findings of the present study bring to fore: 1) that emotional processing deficit and their components are related with mental health, 2) the mental health is also influenced by emotion related beliefs (viz., acceptability and non-acceptability beliefs about emotional expression and negative mood regulation expectancies) and negative affect, and 3) the various emotions related constructs (viz. emotional processing deficit emotion related beliefs and negative affect) are significantly correlated with each other. The pattern of interrelation among the emotional construct on the one hand and their relationship with mental health on the other, suggest a need to examine the interplay of various emotion related constructs (emotional processing deficit, emotion related beliefs and negative affect) in determining mental health of an individual. The nature of interplay of various emotional constructs (viz., emotional processing deficit, negative affect and emotion related beliefs) in relation to mental health was examined using the Structural Equation Modelling (SEM) approach. To explore the nature of interplay of the emotional constructs initially a base model of the structural relationship (path analytic model) among the various constructs was specified and tested. Subsequently, based on the findings of the SEM and earlier empirical evidences/theories, the base model was revised and re-tested till a best fitting model was obtained. The findings related to path analysis (structural relationship models based on SEM) have been summarized below.

Initially the path analytic model was developed in which all the emotion related constructs (viz. acceptability and non-acceptability beliefs, NMR expectancies and emotional processing deficits) were assumed to have a direct influence on mental health and the emotional processing deficit was linked to negative affect also which in turn was linked to mental health in the initial structural relationship model. The emotion related beliefs were assumed to be causally prior to emotional processing deficits and negative affect. Thus all the three variables representing emotion related beliefs (viz., acceptability and non-acceptability beliefs about emotions and NMR expectancies) were linked to (through direct paths) emotional processing deficit as well as negative affect. The emotion related beliefs (represented by three observed variables) were also linked to mental health through direct paths.
The first model assumed that emotional processing deficits influence mental health of an individual directly as well as indirectly through negative affect. Further, it has also been hypothesized in this model that the emotion related beliefs and expectancies would influence health directly as well as indirectly through emotional processing deficit, through negative affect and more indirectly via emotional processing deficit and negative affect. Thus, the model assumes that emotional processing deficits and negative affect would act as a mediational chain or link between the relationship of emotion related beliefs and mental health. This model was created considering these three emotion related beliefs as independent constructs (not three factors of a single construct) and thus they are represented as observed variables and these three constructs were allowed to co-vary. The parameters of the various paths of the above mentioned model (model -1; see Figure-6.1) were estimated and its goodness of fit was evaluated using the AMOS-20. The significance of parameters was tested using bootstrap resampling method (2000 bootstrap samples) with 95% confidence interval.

The test results indicated that model -1 was found to saturated as it has as many parameters as data values (df = 0). As the test of models associated with zero degrees of freedom (i.e, saturated models) generally yield perfect absolute and comparative fit indices, the evaluation of such models depend on the significance of the estimated parameters. The examination of the significance of the parameter estimates (path coefficients) indicated that

![Figure 6.1: The base path analytic model (model – 1) linking emotion to mental health](image)
all the paths were significant except three direct paths - the direct paths from “acceptability beliefs about emotion” to “health”, “non acceptability beliefs about emotions” to “health” and the direct path from “acceptability beliefs about emotion” to “negative affect”.

Thus, the said non-significant paths were eliminated one by one and the resulting revised model was tested. The final revised model (hereafter referred as ‘model -1 revised’) was then tested with similar bootstrap resampling method as was done with model -1. The revised model (model- 1 revised) showed a very good fit to the data as indicated by various absolute and comparative fit indices ($\chi^2 [df=3; N=353]=.269$, $p<.966$; SRMR=.0048; CFI=1.000; GFI=1.000; AGFI=.998; NFI=.999; TLI=1.028; RMSEA=.000)$.

Figure 6.2: Model 1 revised: linking emotion to mental health

Examination of the path coefficient revealed that all the direct paths in the revised model – 1 were significant. To test the significance of indirect paths the ‘user defined estimand’ utility of the AMOS -20 was used and all the possible indirect effects of various emotion related constructs on mental health was tested. The significant direct effect and the indirect effect suggest that though the mental health of an individual is directly influenced only by emotional processing deficit, negative affect, and NMR expectancies, emotion related beliefs (viz., acceptability and non-acceptability beliefs about emotion expression) indirectly influence the mental health status of an individual either by influencing the level of experienced negative affect or the level of emotional processing deficit or both. Further, the findings also suggest that non-acceptability beliefs enhances emotional processing
deficits which in turn enhances the negative affect and enhanced negative affect in turn results in poor mental health. The emotional processing deficit also directly impairs the mental health as well as through directly enhancing negative affect. On the other hand, certain positive emotional beliefs (viz. acceptability beliefs and NMR expectancies) provide indirect protection against the development of mental health problems (as indicated by negative indirect path coefficients).

Another model was also specified and tested in which the three emotion related beliefs were considered as one latent factor (reflected by the acceptability belief about emotions, non-acceptability beliefs about emotions and the generalized negative mood regulation expectancies). The basic assumption was that the said three emotions related beliefs may represent a unique latent construct which is not individually represented by the said three constructs. This model also assumes that emotion related beliefs influence the actual emotional outcomes (i.e., emotional processing deficit and negative affect) as well as mental health. Thus, latent variable emotion related beliefs have been linked to emotional processing deficit, negative affect and mental health through direct paths originating from the latent variable. Similarly, the emotional processing deficit and negative affect have also been linked through direct path to mental health. Further, this model also assumes that emotional processing deficit leads to negative affect and accordingly both variables have been linked through direct path (model-2).

Figure 6.3: Model -2 – Interplay of positive emotional outcomes belief, emotional processing deficit and negative affect in relation to mental health
The test of this alternative model (model -2, Figure -6.3) revealed that it is a good fit as indicated by a non-significant chi square ($\chi^2$ \[df=5; N=353\] = 4.155, p<.527) and acceptable value of other measures of goodness of fit of a model [ SRMR=.0165; CFI=1.000; GFI=.996; AGFI=.984; NFI=.992; TLI=1.005; RMSEA=.000).

Further, the emotional processing deficit in model – 2 has also been found to have a significant indirect effect on mental health through enhanced negative affect. The most interesting and significant finding of this analysis is that the novel construct of positive emotional outcomes belief exert a significant but positive indirect effect on mental health problems or mental ill-health through three different yet related pathways. The negative path coefficients associated with the three indirect paths suggest that positive emotional outcomes belief help to reduce the likelihood of developing symptoms of mental health problems or ill-health through different affective mechanisms. The first indirect path through which the positive emotional outcomes belief reduces the likelihood of developing symptoms of mental health problems is through reduced negative affect (as indicated by negative direct path coefficient). The second indirect path through which positive emotional outcomes belief help to protect one’s mental health is by reducing the emotional processing deficit which has a significant direct effect on mental health. The third pathway includes two– step mediation chain – the positive emotional outcomes belief reduces the level emotional processing deficit and the lower level of emotional processing deficit in turn results in lower level of negative affect which in turn reduces the likelihood of developing symptoms of mental health problems.

Overall, the findings of the path analytic model -2 suggest that the positive emotional outcomes belief has a direct as well as indirect health protecting effect (either through negative affect or emotional processing deficit or both) whereas the emotional processing deficit has a direct health deteriorating effect in addition to its indirect health impairing effect through enhanced negative affect.

Further, though both the path analytic models (model -1 revised and model -2) were found to be a good fit of the data and provide unique information, the question remains which model provides a better explanation of mental health in terms of emotional constructs. To resolve this issue both the models were compared using examining descriptive model fit statistics such as the contemporary criteria of non-nested model comparison using AIC, BIC, BCC, CAIC, and ECVI. The findings revealed that the model -2 was found to be a better fit as compared to model -1 – revised and it provides some unique information also that is not there in model – 1 – revised. Thus, the model – 2 may be considered as supplementing the model -1 revised by providing the additional and
unique information. More specifically, the model – 2 shows the differential contribution of shared variance of various emotion related beliefs (referred as ‘positive emotional outcome beliefs’) to mental health as compared to the contribution of the individual emotional beliefs.

Overall the results of structural equation modelling (path analysis) suggest that emotion related beliefs are the antecedent factors for emotional processing deficit as well as negative emotional experiences. However, the negative emotional experience was found to be a direct consequent of the emotional processing deficit. Thus, in the relationship of emotional processing deficit and mental health, the various emotion related beliefs either individually or collectively as latent construct (positive emotional outcomes belief) appear to be a core antecedent factor leading to emotional processing deficit. On the other hand, the negative affect appears to be a consequent factor depending directly on both the level of emotional processing deficit as well emotion related beliefs. As far as the emotional dynamics underlying mental health is concerned, the findings suggest that an emotion related belief of positive outcomes not only lowers the emotional processing deficit but also reduces the experienced negative affect and both of them ultimately reduces the symptoms of mental health problems. On the other hand, the emotion related belief of negative outcomes (e.g., non-acceptability belief) leads to not only greater difficulty or deficit in processing emotions but also to greater negative affect and the enhanced emotional processing deficit and negative affect result in enhanced symptoms of mental health problems.

**Major conclusions**

Based on the findings of the present study it can be concluded that mental health status of an individual is dependent upon the way they process emotions in their day to day life and their ability and style of emotional processing brings significant direct impact on their mental health as well as indirect impact through altering the level of negative affect. Further, the findings also brings to fore the fact that the nature of beliefs held by an individual determines whether one will be able to process the emotions or not and whether the style of processing emotions would have a beneficial or deteriorating effect on mental health. More specifically, the findings suggest that if individuals believe that they will be able to regulate negative mood (higher NMR expectancies) and/or emotional experiences/expression would lead to positive consequences (e.g. acceptability of negative emotions) then such belief would not only directly improve the mental health but would also improve mental health indirectly by reducing the negative mental health impact of poor emotional processing and negative affect. In the context of implicit theories of beliefs,
the findings imply that the implicit belief about the malleable nature of emotions (e.g., belief about change in negative mood or positive outcomes of emotions) will bring beneficial mental health effect both directly as well as indirectly through reducing the emotional processing deficit and negative affect. On the other hand, the implicit belief about fixed or non-malleable nature of emotions or emotional outcomes (the entity belief e.g., non-acceptability of emotional experience and expression) brings mental health deteriorating effects both directly as well as indirectly by enhancing emotional processing deficit and negative affect.

The findings also provide support to the well-established notion that negative affect impairs mental health and extend this knowledge by demonstrating that the level of negative affect depends upon the nature of emotional beliefs (malleable or incremental belief versus fixed or entity belief) as well the ability and style of emotional processing. The malleability or incremental belief reduces the likelihood of emotional processing deficit as well negative emotional experiences whereas the fixed or entity belief enhances the same.

The findings also suggest that though emotion related beliefs, emotional processing deficit and negative affect has a direct effect on mental health status of an individual, the mental health of an individual is also indirectly influenced by emotion related beliefs through its impact on emotional processing deficit and negative affect.

Based on the findings of the present study it can be concluded that mental health status of an individual is dependent upon the way they process emotions in their day to day life and their ability and style of emotional processing brings significant direct impact on their mental health as well as indirect impact through altering the level of negative affect. Further, the findings also brings to fore the fact that the nature of beliefs held by an individual determines whether one will be able to process the emotions or not and whether the style of processing emotions would have a beneficial or deteriorating effect on mental health. Based on the aforesaid findings an ‘affective model of mental health’ (the diagrammatic representation of the model appears below) of has been proposed in which the interplay of emotional variables in influencing mental health has been outlined.

In sum, the findings of the present study brings to fore the emotional or affective dynamics underlying mental health and suggest that the emotion – health connection can also be explained in terms of emotion related beliefs. In other words, it suggests that emotion related beliefs provide a ground to understand how the various emotional factors influence the mental health status of an individual.